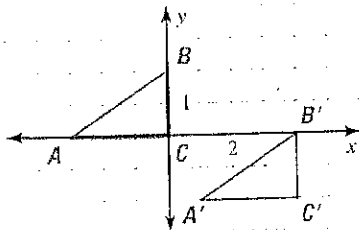


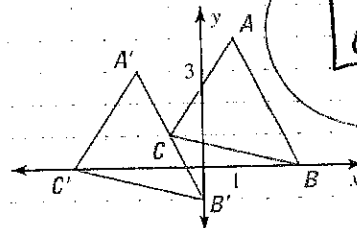
Chapter 9

9.1 $\triangle A'B'C'$ is the image of $\triangle ABC$ after a translation. Write a rule for the translation. Then *verify* that the translation is an isometry.

1.



2.



$$\begin{bmatrix} 14-18 & -7-24 \\ 10+54 & -5+72 \end{bmatrix}$$

$$\begin{bmatrix} -4 & -31 \\ 64 & 67 \end{bmatrix}$$

9.4

9.5

9.5

9.6

9.7

9.7

9.1 Use the point $P(7, -3)$. Find the component form of the vector that describes the translation to P' .

3. $P'(-3, 4)$

4. $P'(1, -1)$

5. $P'(3, 2)$

6. $P'(-8, -11)$

9.2 Add, subtract, or multiply.

7. $\begin{bmatrix} 2 \\ 7 \end{bmatrix} + \begin{bmatrix} 3 \\ 4 \end{bmatrix} = \begin{bmatrix} 5 \\ 11 \end{bmatrix}$

$$\begin{bmatrix} 5 & -4 \\ -13 & 5 \end{bmatrix}$$

8. $\begin{bmatrix} 5 & -3 \\ -9 & 4 \end{bmatrix} - \begin{bmatrix} 0 & 1 \\ 4 & -1 \end{bmatrix} = \begin{bmatrix} 5 & -4 \\ -13 & 5 \end{bmatrix}$

9. $\begin{bmatrix} 7 & -3 \\ 5 & 9 \end{bmatrix} \begin{bmatrix} 2 & -1 \\ 6 & 8 \end{bmatrix}$

9.2 Find the image matrix that represents the translation of the polygon. Then graph the polygon and its image.

10. $\begin{bmatrix} 3 & -5 & 7 \\ -2 & -2 & 1 \end{bmatrix}$; 6 units left

11. $\begin{bmatrix} 1 & 9 & 4 & 3 \\ 5 & 6 & 4 & 2 \end{bmatrix}$; 1 unit right and 7 units down

12. $\begin{bmatrix} 7 & -3 & 0 \\ 6 & 8 & -4 \end{bmatrix}$; 3 units right and 4 units up

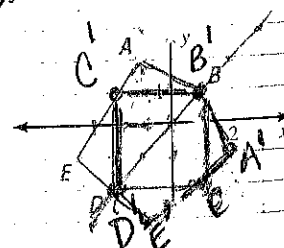
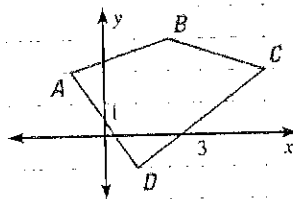
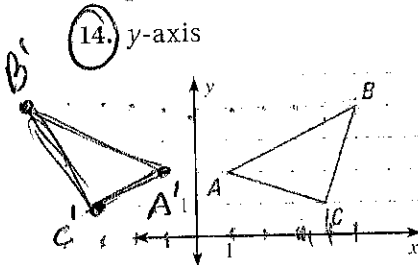
13. $\begin{bmatrix} 9 & 6 & 4 & 2 & 3 \\ -1 & -4 & -4 & -4 & 2 \end{bmatrix}$; 4 units left and 5 units up

9.3 Graph the reflection of the polygon in the given line.

14. y -axis

15. $x = 1$

16. $y = x$



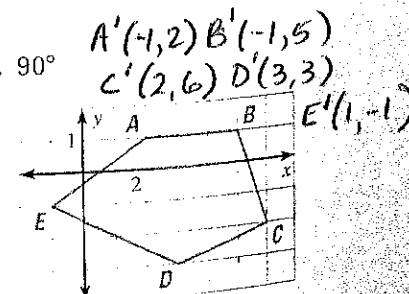
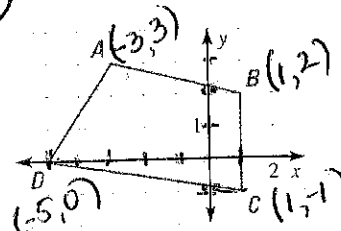
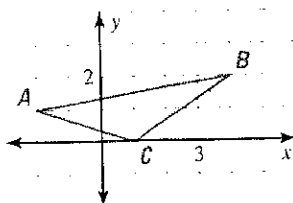
9.4 Rotate the figure the given number of degrees about the origin. List the coordinates of the vertices of the image.

17. 270°

18. 180°

19. 90°

$A'(1, 2)$
 $B'(2, -4)$
 $C'(0, -1)$



$A'(3, -3)$ $B'(-1, -2)$ $C'(-1, 1)$ $D'(5, 0)$

9.4 Find the image matrix that represents the rotation of the polygon about the origin. Then graph the polygon and its image.

20. $\begin{matrix} P & Q & R \\ \begin{bmatrix} 1 & 2 & 4 \\ 4 & 1 & 3 \end{bmatrix}; 180^\circ \end{matrix}$ $\begin{matrix} P' & Q' & R' \\ \begin{bmatrix} -1 & -2 & -4 \\ -4 & -1 & -3 \end{bmatrix} \end{matrix}$ 21. $\begin{matrix} S & T & V \\ \begin{bmatrix} 4 & 2 & 1 \\ 2 & -3 & 0 \end{bmatrix}; 90^\circ \end{matrix}$ $\begin{matrix} S' & T' & V' \\ \begin{bmatrix} -2 & 3 & 0 \\ 4 & 2 & 1 \end{bmatrix} \end{matrix}$ 22. $\begin{matrix} A & B & C & D \\ \begin{bmatrix} 4 & -1 & -2 & 1 \\ 0 & -1 & -2 & -3 \end{bmatrix}; 270^\circ \end{matrix}$ $\begin{matrix} A' & B' & C' & D' \\ \begin{bmatrix} 0 & -1 & -2 & -3 \\ -4 & 1 & 2 & -1 \end{bmatrix} \end{matrix}$

9.5 The vertices of $\triangle ABC$ are $A(1, 1)$, $B(4, 1)$, and $C(2, 4)$. Graph the image of $\triangle ABC$ after a composition of the transformations in the order they are listed.

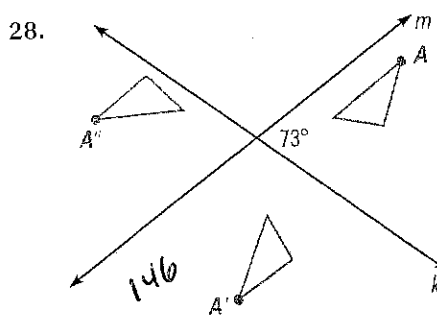
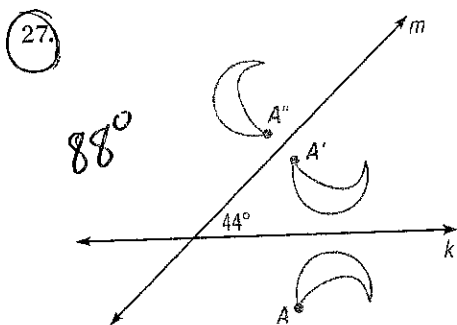
23. Translation: $(x, y) \rightarrow (x - 2, y + 3)$
Rotation: 270° about the origin

25. Rotation: 180° about the origin
Reflection: in the line $y = -2$

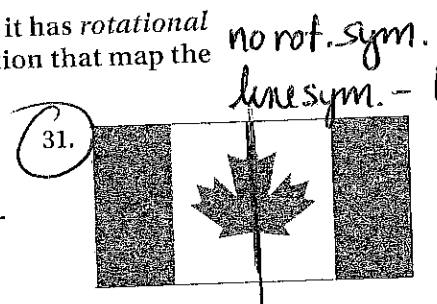
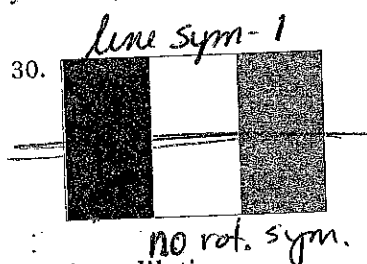
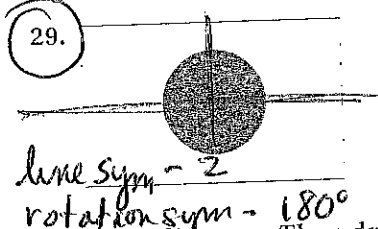
24. Reflection: in the line $x = 2$
Translation: $(x, y) \rightarrow (x + 3, y)$

26. Translation: $(x, y) \rightarrow (x - 4, y - 4)$
Reflection: in the line $y = x$

9.5 Find the angle of rotation that maps A onto A'' .



9.6 Determine whether the flag has line symmetry and whether it has rotational symmetry. Identify all lines of symmetry and angles of rotation that map the figure onto itself.



9.7 Copy the diagram. Then draw the given dilation.

32. Center B ; $k = 2$

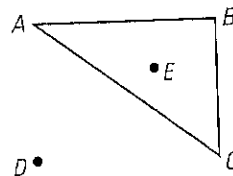
33. Center E ; $k = 3$

34. Center D ; $k = \frac{1}{2}$

35. Center A ; $k = \frac{2}{3}$

36. Center C ; $k = \frac{3}{2}$

37. Center E ; $k = \frac{1}{3}$



9.7 Find the image matrix that represents a dilation of a polygon centered at the origin with a given scale factor. Then graph the polygon and its image.

38. $\begin{matrix} G & H & J \\ \begin{bmatrix} 1 & 3 & 4 \\ 4 & 2 & 4 \end{bmatrix}; k = 3 \end{matrix}$ $\begin{matrix} G' & H' & J' \\ \begin{bmatrix} 3 & 9 & 12 \\ 12 & 6 & 12 \end{bmatrix} \end{matrix}$

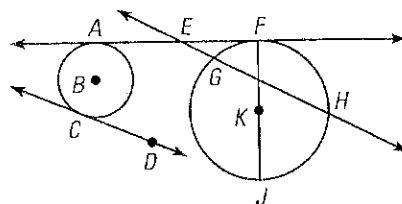
39. $\begin{matrix} K & L & M & N \\ \begin{bmatrix} 2 & 4 & 6 & 5 \\ -2 & -2 & 0 & 4 \end{bmatrix}; k = \frac{1}{2} \end{matrix}$ $\begin{matrix} K' & L' & M' & N' \\ \begin{bmatrix} 1 & 2 & 3 & \frac{5}{2} \\ -1 & -1 & 0 & 2 \end{bmatrix} \end{matrix}$

40. $\begin{matrix} P & Q & R \\ \begin{bmatrix} -3 & -3 & -1 \\ -1 & -3 & -3 \end{bmatrix}; k = 4 \end{matrix}$ $\begin{matrix} P' & Q' & R' \\ \begin{bmatrix} -12 & -12 & -4 \\ -4 & -12 & -12 \end{bmatrix} \end{matrix}$

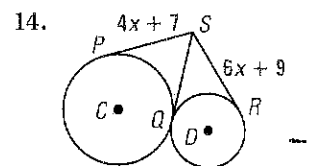
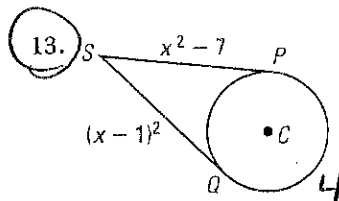
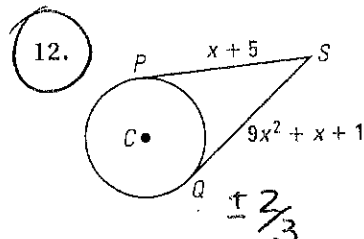
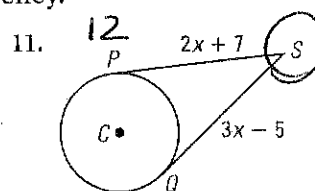
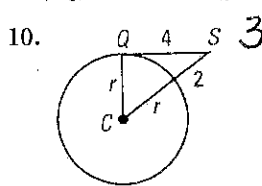
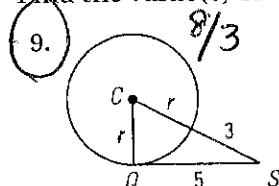
Chapter 10

10.1 Use the diagram to give an example of the term.

- Radius \overline{KF}
- Common tangent \overleftrightarrow{AF}
- Tangent \overleftrightarrow{AF}
- Secant \overleftrightarrow{GH}
- Center K
- Point of tangency F
- Chord \overline{GH}
- Diameter \overline{FJ}

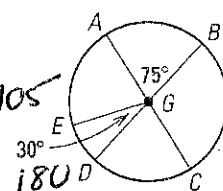


10.1 Find the value(s) of the variable. P, Q, and R are points of tangency.



10.2 \overline{AC} and \overline{BD} are diameters of $\odot G$. Determine whether the arc is a *minor arc*, a *major arc*, or a *semicircle* of $\odot G$. Then find the measure of the arc.

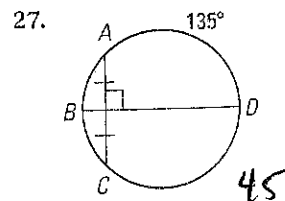
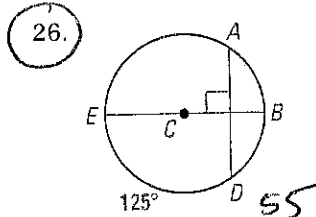
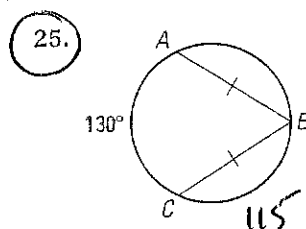
- \widehat{ED} minor, 30
- \widehat{EB} minor, 150
- \widehat{EC} minor, 105
- \widehat{BEC} major, 255
- \widehat{BC} minor, 105
- \widehat{BCD} semicircle, 180



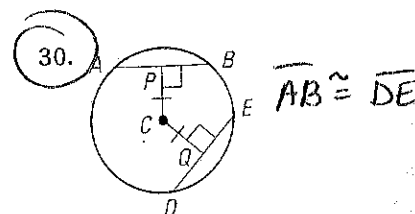
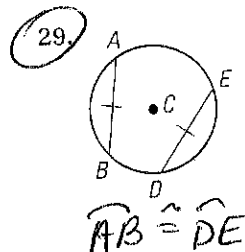
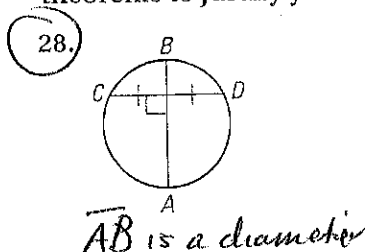
10.2 In $\odot C$, $m\widehat{AD} = 50^\circ$, B bisects \widehat{AD} , and \overline{AE} is a diameter. Find the measure of the arc.

- \widehat{AED} 310
- \widehat{BD} 25
- \widehat{DE} 130
- \widehat{BAE} 205

10.3 Find the measure of \widehat{AB} .

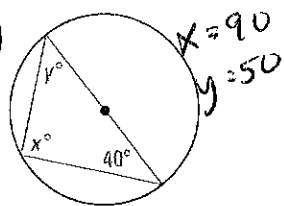


10.3 In Exercises 28–30, what can you conclude about the diagram shown? State theorems to justify your answer.

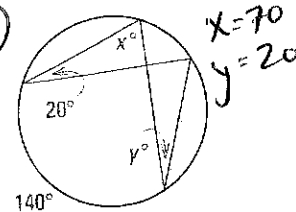


10.4 Find the values of the variables.

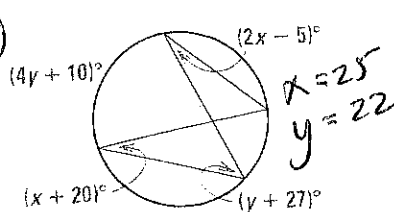
31.



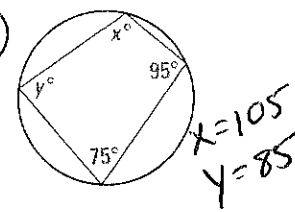
32.



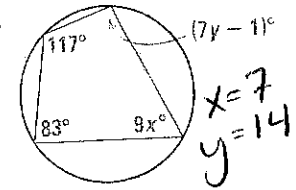
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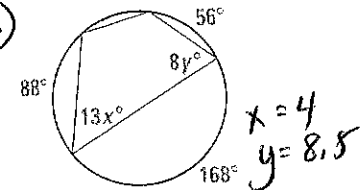
34.



35.

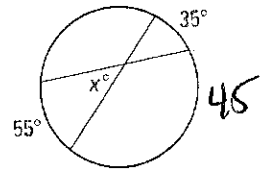


36.

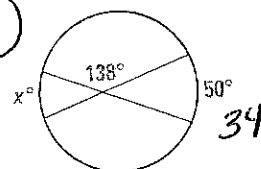


10.5 Find the value of x.

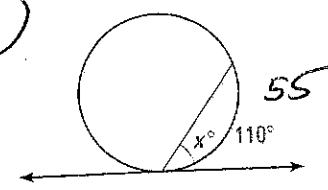
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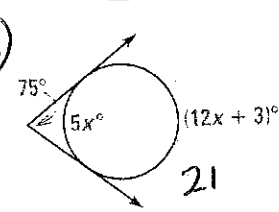
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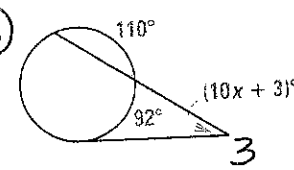
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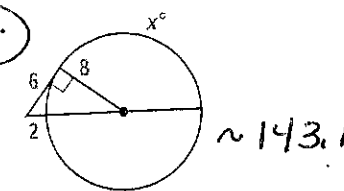
40.



41.

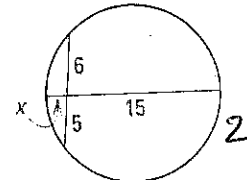


42.

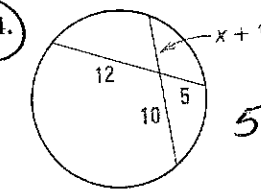


10.6 Find the value of x.

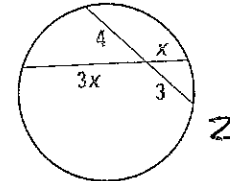
43.



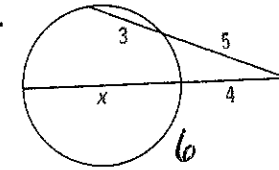
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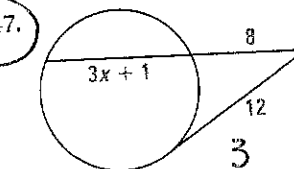
45.



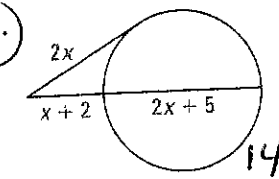
46.



47.



48.



10.7 Use the given information to write the standard equation for the circle.

49.

The center is (0, -2), and the radius is 4 units. $x^2 + (y + 2)^2 = 16$

50.

The center is (2, -3), and a point on the circle is (7, -8). $(x - 2)^2 + (y + 3)^2 = 50$

51.

The center is (m, n), and a point on the circle is (m + h, n + k). $(x - m)^2 + (y - n)^2 = h^2 + k^2$

10.7 Graph the equation.

52.

$$x^2 + y^2 = 25$$

53.

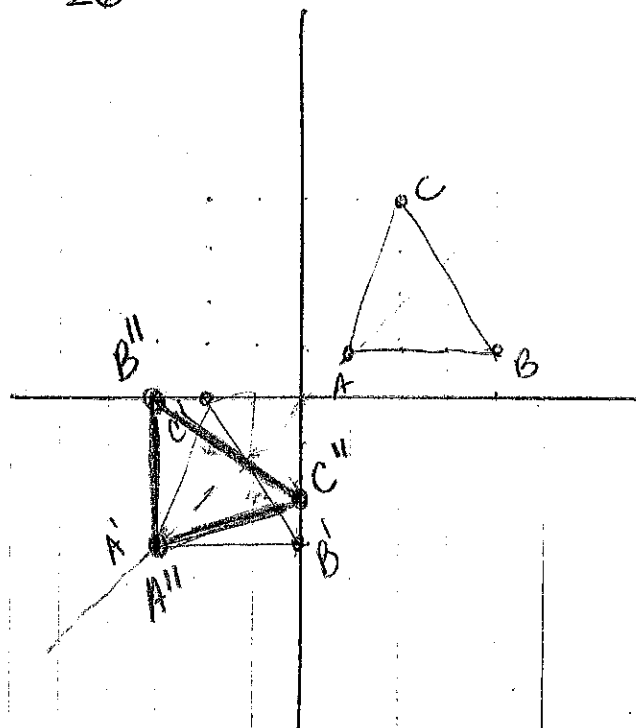
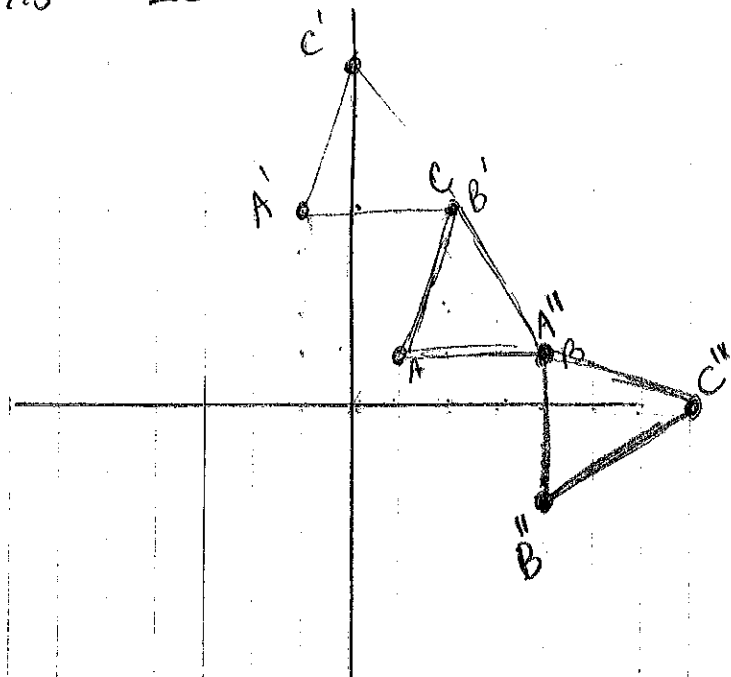
$$x^2 + (y - 5)^2 = 121$$

54.

$$(x + 4)^2 + (y - 1)^2 = 49$$

EXTRA PRACTICE

#26



10.7 #54

